

Polarized light scattering

- Critical Issues

- Light scattering is the basis for a variety of high throughput screening techniques used by industry to characterize materials. Scattering is sensitive to interfacial roughness, particulate contaminants, subsurface defects, and material inhomogeneity. However, measurements of scattering intensity suffer from lack of specificity, and the inverse scattering problem is difficult, if not impossible, to solve. However, recent work has shown that information contained in the polarization properties of the scattered light allow many of these scattering mechanisms to be distinguished. These findings suggest that new high throughput screening methods based upon polarized light scattering could be developed.

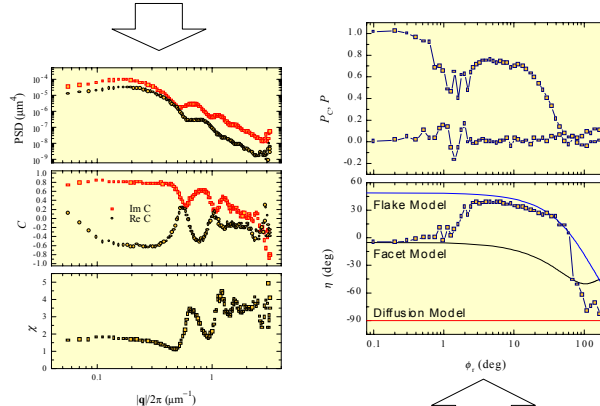
- Research Strategy

- The success of light scattering methods depends upon the availability of accurate theories for scattering. These models are developed with an aim of learning which model parameters affect which scattering parameters. Model systems are developed in the laboratory and used to test the validity of the theories. Instrumentation is also developed to demonstrate the application of polarized light scattering techniques for specific applications.

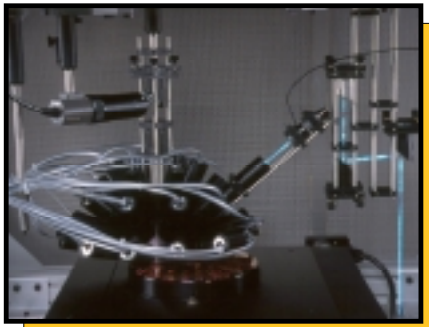


The Goniometric Optical Scatter Instrument is a high angular-resolution tool for characterizing light scattering by materials.

The roughness of both interfaces of a diblock-copolymer layer on a rough silicon layer, measured with light scattering ellipsometry.



Polarization of light scattered by a pearlescent paint showing angles at which different scattering mechanisms dominate.



The Multidetector Hemispherical Polarized Optical Scatter Instrument is a prototype for a high-throughput tool for inspecting materials.

For more information ...

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